

WHAT IS CLAIMED IS:

1. A coherent light source comprising:  
fundamental light having a first wavelength; and  
a wavelength converting device for converting the wavelength of the fundamental light by half,  
the wavelength converting device converting the fundamental light into harmonic light having a second wavelength,  
wherein the wavelength of the harmonic light is controlled in such a manner that the wavelength of the fundamental light is detected and controlled to a desired wavelength.
2. The coherent light source according to claim 1, wherein the fundamental light is emitted from a semiconductor laser having a wavelength-variable function.
3. The coherent light source according to claim 2, wherein the semiconductor laser comprises an active region, a phase control region and a distributed Bragg reflection (DBR) region.
4. The coherent light source according to claim 3, wherein the desired wavelength is within a phase-matching wavelength tolerance of the wavelength converting device, and a variation in wavelength of the fundamental light with a change in operating current thereof is compensated by changing current to be input to the phase control region or the DBR region.
5. A coherent light source comprising:  
fundamental light having a first wavelength; and  
a wavelength converting device for converting the wavelength of the fundamental light by half,  
the wavelength converting device converting the fundamental light into harmonic light having a second wavelength,  
wherein a first mechanism that detects the wavelength of the fundamental light and controls it to a desired wavelength and a second mechanism that controls a phase-matching wavelength of the wavelength converting device to the wavelength of the fundamental light are provided to

control the wavelength and output of the harmonic light.

6. The coherent light source according to claim 1 or 5, wherein the wavelength of the fundamental light that has passed through the  
5 wavelength converting device is detected so as to be controlled to the desired wavelength.
7. The coherent light source according to claim 1 or 5, wherein a means for separating the fundamental light and the harmonic light and detecting  
10 only the fundamental light is provided on an optical path through which light generated by wavelength conversion with the wavelength converting device travels.
8. The coherent light source according to claim 1 or 5, further  
15 comprising:  
a diffraction grating; and  
a photo-detector,  
wherein the photo-detector detects the fundamental light diffracted  
by the diffraction grating.  
20
9. The coherent light source according to claim 8, wherein the wavelength converting device has an optical waveguide, and the diffraction grating is formed on the optical waveguide.  
25 10. The coherent light source according to claim 8, wherein the photo-detector detects a position of the fundamental light diffracted by the diffraction grating.
11. The coherent light source according to claim 8, wherein the  
30 diffraction grating is formed as a chirped grating whose grating pitch is changed depending on location.  
35
12. The coherent light source according to claim 9, wherein the photo-detector is provided on one side of a substrate on which the optical waveguide is formed.  
13. The coherent light source according to claim 1 or 5, further

comprising:

a cesium (Cs) gas cell; and  
a photo-detector,

5 wherein the photo-detector detects the fundamental light that has passed through the Cs gas cell.

14. The coherent light source according to claim 5, wherein the phase-matching wavelength of the wavelength converting device is varied by changing a refractive index of the wavelength converting device with  
10 electrooptic effect or temperature change.
15. A recording/reproducing apparatus comprising:  
the coherent light source according to claim 1 or 5,  
wherein the coherent light source is adjusted to have an optimum  
15 wavelength that meets the Bragg conditions in reproducing hologram information recorded on a medium.
16. A recording/reproducing apparatus comprising:  
the coherent light source according to claim 1 or 5 and  
20 an optical system for focusing light emitted from the coherent light source on an information medium.